PROTOCOL

Human Health Receptors and Scenarios

Introduction

This protocol has been developed in order to support the Savannah River Site environmental remediation program. This protocol provides details on the standard receptors and scenarios used for human health risk evaluation. The protocol instructions are based on the latest available EPA guidance as well as on input from the staff of EPA and SCDHEC.

The exposure groups for human health risk analysis are described in the Exposure Group Protocol. The process described below is intended to be applied after application of the Unit-Source Data Processing Protocol and Unit-Background Data Processing Protocol. A quantitative evaluation will be performed for the following on-unit hypothetical exposure scenarios, which include both SRS specific, and EPA standardized receptors:

- SRS Worker
- Industrial Worker
- Resident Adult/Child

Evaluation of other human receptors such as trespassers or recreational users may be appropriate in addition to the standard receptors presented above. Evaluation of additional receptors will be assessed on a case-by-case basis. The following sections provide brief descriptions of the above human health exposure scenarios. Specific values for exposure parameters can be found in the Human Health Exposure Parameters Protocols.

Details

1. Exposure Scenarios

Hypothetical On-Unit SRS Worker Exposure Scenario

The SRS on-unit worker exposure scenario addresses potential risks to site workers who visit the unit on an infrequent or occasional basis, such as a researcher associated with an organization that uses SRS as an outdoor

laboratory or a site maintenance worker. Additional on-unit workers, such as personnel who sample monitoring wells, are also evaluated if appropriate.

The primary exposure pathway for evaluation relative to the SRS on-unit worker include:

- Exposure to contaminated soils via incidental ingestion, dermal contact inhalation of windblown dust, inhalation of volatile constituents, if present, and external exposure from radionuclides, if present.

- Note that a drinking water pathway is not credible for the hypothetical SRS on-unit worker since shallow groundwater is not used as a source of drinking water at SRS.

Hypothetical On-Unit Industrial Worker Exposure Scenario

The hypothetical on-unit industrial worker exposure scenario is a standard EPA scenario, which addresses long-term risks to workers who are exposed to unit contaminants while working within an industrial setting. The hypothetical on-unit industrial worker is an adult who works in an outdoor industrial setting for the majority of his time. The primary exposure pathways for evaluation relative to the hypothetical on-unit industrial worker include:

- Exposure to contaminated soils -via incidental ingestion, dermal contact inhalation of windblown dust, inhalation of volatile constituents, if present, and external exposure from radionuclides, if present.

- Exposure to groundwater through ingestion of drinking water from contaminated sources.

- Note that a route of exposure due to showering is not included.

Hypothetical On-Unit Resident Adult / Child Exposure Scenario

The hypothetical on-unit resident adult / child exposure scenario evaluates long term risks to individuals expected to have unrestricted use of the unit. It assumes that residents live on the unit and are exposed chronically, both indoors and outdoors, to unit contaminants. The hypothetical on-unit resident includes adults and children who will be exposed to all of the contaminated media.

The primary exposure routes utilized for evaluation relative to the hypothetical on-unit resident (adult and child) include:

- Exposure to contaminated soils (incidental ingestion, inhalation of windblown dust and possibly volatile constituents, dermal contact, and external exposure).

- Exposure to groundwater (ingestion, dermal contact, and possibly inhalation of volatile contaminants).

- Exposure to contaminated sediment and surface water, if present (ingestion, external exposure, and dermal contact)

- Exposure from the consumption of contaminated homegrown produce.

2. Approach

The approach to the evaluation of exposures for all three scenarios is the same. The receptor is assumed to be present on the unit at time t=0 (i.e. the present time). The concentrations of the contaminants are generally maintained at the t=0 concentration over the duration of the exposure time.

Note that two cases are considered for the hypothetical on-unit resident and the industrial worker. The first examines exposures to surface soils and deeper soils in their present locations. The second examines the exposures, which could occur if the soils down to 4 feet are excavated and redistributed around the surface of the unit.

3. Summary

In summary, the following five hypothetical scenarios will be evaluated:

Number	*Scenario*
1	SRS worker
2	Industrial worker (w/o excavation)
3	Industrial worker (w excavation)
4	Resident (w/o excavation)
5	Resident (w excavation)